THE VOLCANIC ACTIVITY OF MOUNT ST. HELENS AND MOUNT HOOD IN HISTORICAL TIME

By WILLARD ROUSE JILLSON

Not a little has been written in one form or another concerning the prehistoric and recent activity of those splendid volcanic cones of the Cascade Mountains which stand like sentinels on guard at the gateway of the Columbia River. Mount St. Helens (9,750 feet) in Washington is about forty miles north of the Columbia, and Mount Hood (11,225 feet) in Oregon is about twenty miles south. By reason of their dominant size (Vancouver reported Mount Hood to be 25,000 feet high), their beauty, and their relative position, these mountains have been called the "Guardians of the Columbia." About their magnificent, perpetually snow-clad peaks is woven a wealth of legend and description, which antedates the arrival to this North Pacific coast of the first intrepid Spanish and English explorers.

Perhaps the most unreliable, though not the least picturesque, source of information concerning the activity of these old volcanoes is to be found in the tradition and tribal lore of the Puget Sound, Columbia River, and coastal Indians. These primitive peoples, after nearly a century of contact with civilization, still speak with mingled awe and reverence of the "Fire Mountain" (Mount St. Helens) and the "Mountain That Was God" (Mount Rainier). Captain J. C. Frémont in his exploration camp on the Columbia River on November 27, 1843, wrote in his diary[1] with respect to Mount Hood and Mount Jefferson, the next prominent volcano to the south, "The Indian superstition has peopled their lofty peaks with evil spirits, and they have never yet known the tread of a human foot." The original diary of Lewis and Clark,[2] who reached the mouth of the Columbia in December, 1805, also alludes to this characteristic superstition. It does not refer, however, to volcanic activity in either Mount St. Helens or Mount Hood. S. F. Emmons in a report on "The Volcanoes of the Pacific Coast of the United States" says[3]:

> Even our half-civilized Indians of the Northwest, in spite of their association with the white man, cannot be induced, by hope of reward or fear of punishment, to approach the snow-covered peaks in their midst, whose actual manifestations of volcanic energy must exist in their minds as dim traditions.

The first authoritative reports of volcanic activity of these Columbia

[1] Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, and to Oregon and North California in the years 1843-44, Office of Explorations and Surveys, War Department, Washington, 1845; reference on p. 199.

[2] Original Journal of the Lewis and Clark Expedition, 1804-1806, edit. by R. G. Thwaites, 7 vols. and atlas, New York, 1904-05; reference in Vol. 3.

[3] *Journ. Amer. Geogr. Soc.*, Vol. 9, 1877, pp. 45-65; reference on p. 45.

River volcanoes come from the same source. A little farther on[4] Emmons says:

Mt. St. Helens, on the other hand, is remarkable for its regular conical shape. It is . . . the only peak of which I was able to get a definite account of an eruption. I was told by an old French Canadian voyageur, formerly in the employ of the Hudson's Bay Fur Company, that St. Helens was in active eruption in the winter of 1841-2. To use his expression, the light from the burning volcano was so intense that one could see to pick up a pin in the grass at midnight near his cabin. . . .

Captain Frémont, again, writes[5] under the date of November 13, 1843:

Wherever we came in contact with the rocks of these mountains, we found them volcanic, which is probably the character of the range; and at this time, two of the great snowy cones, Mount Regnier [Mount Rainier] and St. Helens, were in action. On the 23d of the preceding November [Nov. 23, 1842], St. Helens had scattered its ashes, like a light fall of snow, over the Dalles of the Columbia, 50 miles distant. A specimen of these ashes was given to me by Mr. Brewer, one of the clergymen at the Dalles.

Evidence in corroboration of this statement and date is to be found in various sources, the most authoritative of which is the following. The Rev. J. L. Parrish of Salem, Oregon, writing in *Steel Points,* a Portland (Ore.) mountaineering quarterly magazine, says[6]:

. . . On the 22d day of November, 1842, I was in the old Mission house, ten miles below Salem, with several other missionaries. . . . I stepped outside and noticed the eruption of Mt. St. Helens. . . . We saw arising from its summit immense and beautiful scrolls . . . of steam. Then came a stratum just below . . . which was an indefinite gray. Then down next the mountain's top the substance emitted was black as ink. The next day . . . I noticed that she [Mount St. Helens] had changed her snowy dress of pure white for a sombre black mantle. The ashes fell at the Dalles to the depth of half an inch. . . . The eruption was on the south side of the mountain about two-thirds of the distance from the bottom to the top.

About sixty miles to the south of Mount St. Helens and just across the Columbia River stands the picturesque cone of Mount Hood, the "Pride of Portland." Geographically and geologically its history is linked with that of Mount St. Helens as well as a number of lesser associated peaks. Its volcanic activity may be traced (if signed reports published in Oregon and Washington newspapers and periodicals may be relied on) to a much more recent date than that of its sister mountain. W. F. Courtney of Walla Walla, Washington, writing of activity in Mount Hood in the *Everett* (Wash.) *Record,* May 17, 1902, says[7]:

The eruption took place during the latter part of September, 1859. . . . We were camped on Tie Ridge about thirty-five miles from Mount Hood. . . . It was about 1:30 o'clock in the morning . . . when suddenly the heavens lit up and from the dark there shot up a column of fire. With a flash that illuminated the whole mountainside with a pinkish glare, the flame danced from the crater. . . . For two hours, as we watched, the mountain continued to blaze at irregular intervals, and when morning came Mount

[4] p. 53.
[5] *Op. cit.*, pp. 193-194.
[6] Vol. 1, No. 1, pp. 25-26.
[7] Quoted in *Steel Points*, Vol. 1, No. 3, p. 135.

Hood presented a peculiar sight. His sides, where the day before there was snow, were blackened as if cinders and ashes had been thrown out.

Under the title of "Eruptions of Mount Hood" the weekly *Oregonian* (Portland) of August 20, 1859, says in part[8]:

On Thursday night the fire was plainly seen. . . . Yesterday the mountain was closely examined, when it was seen that a large mass of the northwest side had disappeared. . . . The dense cloud of steam and smoke constantly rising over and far above the summit, together with the entire change in its appearance heretofore, convinces us that Mount Hood is now in a state of eruption, which has broken out within a few days.

The most recent recorded activity of Mount Hood occurred September 21, 1865. The *Oregonian* of September 26, 1865, says in part[9]:

It is some time since we have had an excitement about Old Mount Hood belching forth, but on Saturday last the active puffs of dense black smoke were witnessed by hundreds of people in this city.

Farther on[9] it prints a letter from a John Dever, Company E, 1st Regiment Washington Territory Volunteers, written at the Vancouver, Wash., barracks, where he was a part of the guard in the early morning of June 21, 1865:

. . . Judge, then, of my surprise to see the top of Mount Hood enveloped in smoke and flame . . . accompanied by discharges of what appeared to be fragments of rock, cast up a considerable distance, which I could perceive fell immediately with a rumbling noise not unlike distant thunder. This phenomenon was witnessed by other members of the guard. . . .

The probability of the genuineness of these and similar statements will not be questioned by any one who is familiar with the geology and the physiography of Mount St. Helens and Mount Hood. Each of these mountains is a beautifully symmetrical cone the higher elevations of which are only slightly scarred by stream and glacial erosion. Mount Hood is the more sharply pointed, owing to the loss of a part of the crater rim. Both mountains show toward their bases well-developed lateral drains choked with lava flows, minor vents, and "blow holes." In many cases these flows present a most strikingly recent appearance, with bright, new, and strongly outlined surfaces, neither aggraded nor degraded, and barren of any vegetation except the scantiest.

Various travelers, prospectors, and United States army officers who penetrated into the primeval forests of this northwest wonderland have noted these things, and each one has brought back his own story. Lieut. C. P. Elliott, U. S. A., after exploring Mount St. Helens, made a rough reconnaissance topographic map of the area.[10] He noted the choking and damming of the lateral drains and speaks in particular of two instances which have a present bearing. The first one is that of a drain into the Kalama River, where the lava dam has formed the beautiful Lake Merrill ("Trout

[8] Quoted in *Steel Points*, Vol. 1, No. 3, p. 136.
[9] Quoted in *Steel Points*, Vol. 1, No. 1, p. 23.
[10] Mount St. Helens, with map, 1:180,000, *Natl. Geogr. Mag.*, Vol. 8, 1897, pp. 226-230.

Lake,'' by some), which is unique in that it has no surface outlet and appears never to have had one. Speaking of this lava dam he says: ''Further to the north and toward the Kalama River, where the lava flowed over the standing trees (the places of the trunks now forming wells in the lava), running water can be heard.'' Russell, in his ''Volcanoes of North America,''[11] notes that Mount St. Helens, which was ascended as early as 1889, ''seems to have been active in recent years, and is fresher in appearance than Mount Hood.'' He also refers to the lava-damming of Lake Merrill, the lava tree casts, the still active ''fumaroles,'' and the recent ''blow holes'' on the long lava flow on the southwest side of the mountain. Lieutenant Elliott has referred[12] to this lava bed, which finds its origin somewhere near Butte Camp at an elevation of 4,500 feet, and flows and cascades down a number of old valleys for nearly ten miles to the Lewis River, where it terminates in a number of large conical ''blow holes'' at an elevation of 1,000 feet. Its principal course lies between Cougar Creek and Big Creek, mainly in two large drains, one of which supplies the underground water for Lost Creek. Incidentally this superb lava flow is chiefly notable throughout the Northwest for its great cave, over a mile in length and one of the largest of its kind in North America.[13] This flow has been identified as the one referred to by Frémont, Parrish, and Emmons as being active on November 22, 1842, and also possibly in 1841.

The summer of 1915 was spent by the writer in studying in the field the geology and physiography of Mount St. Helens and its environs. On August 5, 1915, the summit was reached after a hard two hours' climb from Butte Camp. Previous to this, three weeks had been spent at an elevation of 4,000 to 7,000 feet, where many evidences were found of recent mild eruptions. Among other things of interest disintegrating charcoal and wood fiber in one of the horizontal lava tree casts in the great flow of the southwest side of the mountain were discovered. This evidence is made the subject-matter of another paper, ''New Evidence of a Recent Volcanic Eruption on Mount St. Helens, Washington.''[14] The importance of this discovery was anticipated by J. S. Diller, who speaks[15] at length as to the value of these lava tree casts. His deductions, made from a résumé of the better known literature, are that mild eruptions of diminishing strength and duration have most likely occurred on Mount St. Helens within the last century.

In conclusion it seems worth while to call attention summarily to the following facts. The separate and unrelated reports and statements of Frémont, Emmons, and Parrish fix without question the date of November 22, 1842, as one of considerable volcanic activity of an eruptive and extru-

[11] New York, 1897, p. 241.
[12] *Ibid.*, p. 228.
[13] The Lava Caves of St. Helens, *Mazama*, Vol. 2, 1900-05, pp. 134-135.
[14] *Amer. Journ. of Science*, in press.
[15] Latest Volcanic Eruptions of the Pacific Coast, *Science*, Vol. 9, 1899, pp. 639-640.

sive nature on Mount St. Helens. The reports of Diller, Elliott, and others establish without doubt the recency of such volcanic activity. In consideration of the charcoal and wood fiber in the lava casts it may be that the last ebbing tide of extrusive vulcanism of Mount St. Helens continued on in a feeble, localized, and intermittent way until well into the third quarter of the nineteenth century, as published observations have shown to have been the case with Mount Hood. In the light of this suggestion it is interesting now to reconsider causally what vital rôle may have been played in the lives of the early natives of this part of the Cascade Mountains at no really distant date by these two "Guardians of the Columbia."